



Administrative Procedure

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Maintaining 3M GVP Powered Air Purifying Respirators

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Administrative Use

Maintaining 3M GVP Powered Air Purifying Respirators**Published Date: 06/10/2009****Effective Date: 06/10/2009****CHANGE SUMMARY****AJHA:** N/A**Periodic Review Due Date:** N/A**HRB Date:** N/A**Validation Date:** N/A**Rev. 0, Chg. 0 PR#:** 09-0587**USQ Screen Number:**

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Description of Change

New procedure to document the maintenance and care of the 3M GVP PAPR

Maintaining 3M GVP Powered Air Purifying Respirators**Published Date: 06/10/2009****Effective Date: 06/10/2009****TABLE OF CONTENTS**

1.0	INTRODUCTION.....	3
1.1	Purpose	3
1.2	Scope	3
1.3	Applicability.....	3
1.4	Implementation	3
2.0	RESPONSIBILITIES.....	3
3.0	PROCESS.....	3
3.1	Initial PAPR Inspection.....	4
3.2	PAPR Exterior Cleaning.....	4
3.3	Power Cord (GVP-210).....	4
3.4	Smart Battery Charger (BC-210).....	4
3.5	3M Flow Check Device with Adapter (GVP-113 and L-181)	5
3.6	Breathing Tube Inspection	6
3.7	New Nickel Metal Hydride (NiMH) Battery Properties and Conditioning	6
3.8	Quarterly Nickel Metal Hydride Battery Capacity Verification	7
3.9	Pre-assembly and Quarterly Blower-Motor Inspection (GVP-100).....	8
3.10	Pre Assembly Nickel Metal Hydride (NiMH) Battery (BP-15) Inspection.....	9
3.11	Belt Inspection	9
3.12	Long-Term Storage and Disposition of Equipment.....	9
4.0	FORMS	9
5.0	RECORD IDENTIFICATION.....	10
6.0	SOURCES	10
6.1	Requirements	10
6.2	References	10

List of Tables

Table 1.	Charger Status Indicators.....	5
Table 2.	Charger Status/Adaptor Module Indicators.....	7

List of Attachments

Attachment 1	Quarterly PAPR Blower Inspection Log.....	11
Attachment 2	Daily PAPR Battery Charging Log.....	12
Attachment 3	Quarterly/Initial PAPR Battery Charging and Inspection Log	13

Maintaining 3M GVP Powered Air Purifying Respirators**Published Date: 06/10/2009****Effective Date: 06/10/2009****1.0 INTRODUCTION**

Occupational Safety and Health Administration (OSHA) regulations and National Institute for Occupational Safety and Health (NIOSH) certification requires that a maintenance program be established for respiratory protection equipment. The maintenance program must include cleaning, component inspection, and replacement of worn or damaged parts (i.e., external breathing tube, cartridge gaskets, and power cord).

1.1 Purpose

This procedure is to provide instructions for the required inspection and charging of 3M GVP Belt-Mounted Powered Air Purifying Respirators (PAPRs).

1.2 Scope

This maintenance program provides instructions for personnel to perform routine required services in accordance with manufacturer's recommendations.

1.3 Applicability

This applies to each CH2M HILL Plateau Remediation Company (CHPRC) organization that performs issuance of 3M GVP PAPRs.

1.4 Implementation

This procedure is effective upon publication.

2.0 RESPONSIBILITIES

Line supervisors are responsible for verifying that personnel using portions or all of this procedure are adequately trained to this procedure and can successfully perform assigned duties.

This procedure is to be performed by designated and trained personnel. Since there are no user serviceable parts on this equipment, personnel using this procedure are not required to be factory trained.

3.0 PROCESS

The most current version of the 3M GVP Manufacturer's Instructions for use are to be followed. Copies of the instructions are posted on the CHPRC respiratory protection website.

If a *CH-PRC Respiratory Problem or Complaint Form* (A-6001-893) is submitted to the issuance station along with a PAPR, any suspect damaged items should be evaluated and discarded with concurrence of your respiratory protection Subject Matter Expert (SME). Notes on the issue should be included on the appropriate attachments.

No repairs are authorized for internal worn or damaged parts. Personnel may only change out external parts such as gaskets.

PAPR components are to be stored and maintained in an environmentally controlled facility.

Maintaining 3M GVP Powered Air Purifying Respirators

Published Date: 06/10/2009

Effective Date: 06/10/2009

3.1 Initial PAPR Inspection

Each battery and blower unit is to be given a unique and permanent identification number. This unique number is recorded on a Quarterly PAPR Blower Inspection Log (Attachment 1), Daily PAPR Battery Charging Log (Attachment 2), and Quarterly/Initial PAPR Battery Charging and Inspection Log (Attachment 3) by the issuance station to track maintenance. The log will include the date of manufacture for batteries and a record of inspection performed.

Any damaged or questionable parts are to be documented on the appropriate attachment. Damaged items should be evaluated and discarded with concurrence of the user's respiratory protection SME.

3.2 PAPR Exterior Cleaning

The PAPR must have been cleared of any radiological, chemical, or biological contamination prior to being returned to the issuance station. All components of the PAPR assembly (i.e., blower-motor, breathing tube, battery, face-piece, hood, and belt) must be cleaned or discarded after each use as necessary. This cleaning can be accomplished by an external wipe down with a damp towel or sponge if any dust or grime is present. **Do not immerse** the blower-motor or breathing tube in water; simply wipe down the exterior surfaces.

Tight fitting face-pieces must be sent to contracted laundry service for cleaning. Loose fitting hoods are disposed of or may be reused with concurrence from the user if they are confirmed to be uncontaminated, properly stored, and are used by the same person. Cleaning of loose fitting hoods is not authorized. Loose fitting hood harnesses or hard hats may be wiped down as described below to remove surface grime.

3.3 Power Cord (GVP-210)

The power cord must be checked for the following:

- Visually inspect the power cord and end connectors for signs of damage such as cracks or cuts.
- Discard the power cord if it fails this inspection.

3.4 Smart Battery Charger (BC-210)

The battery charger and its power cord must be checked for the following:

WARNING:

There are no field serviceable parts inside the smart battery charger. Do not attempt to open the charger case or expose the charger to moisture. Doing so may result in serious bodily injury or death due to electrical shock.

- Before use of a new Smart Battery Charger BC-210, the plastic protective cover must be removed from between the power base and the adapter module.
 - Verify that the smart battery charger is unplugged from any wall outlet.

Maintaining 3M GVP Powered Air Purifying Respirators**Published Date: 06/10/2009****Effective Date: 06/10/2009**

- Remove the plastic protective cover by pulling the adapter module straight up out of the power base and removing the plastic protective cover.
- Replace the adapter module in the power base by pushing it straight down into the power base, aligning the guide slots.
- Check for proper operation by plugging the smart battery charger in and observing the indicator lights for proper function.
- Visually inspect the battery charger and power cord for signs of damage such as cracks or cuts.
- The BC-210 Smart Battery Chargers can be connected (up to 10 chargers maximum) to produce a multi-station charger.
- To connect, first ensure the charger is unplugged from the wall outlet.
 - Remove the socket cover from the BC-210 smart battery charger and save for later use.
 - Remove the screw from the bottom of the BC-210 in the semi-circle area.
 - Slide male connection on the left of the charger into the female connection on the right side of the other charger.
 - Insert and tighten the screw in the hole from which it was removed.
- Plug the charger power cord into the BC-210 smart battery charger and the other end into a wall outlet that is easily accessible to the user. The charger will automatically detect and self-adjust to input voltages of 100 to 240 volts and frequencies of 50 to 60 Hz.
- The light-emitting diode (LED) on the power base (on the left) indicates the status of the charger (Table 1).

Table 1. Charger Status Indicators

<i>Power Base Status</i>	<i>LED Status</i>
Power is OK, ready to start charging.	Steady Green.
Excess current, not ready to charge.	Steady Yellow.
Too hot.	Steady Red.

- Discard the charger if it fails this inspection.
- Discard the charger if it fails to charge batteries.

3.5 3M Flow Check Device with Adapter (GVP-113 and L-181)

The 3M flow check device with adapter is a ball-in-tube indicating cubic foot per minute (CFM) flow being produced by the blower-motor unit. It is used to verify adequate flow in Section 3.9 and can also be used by the PAPR user, as an option, to verify flow prior to donning the PAPR. There are no mechanical parts, and wear from use does not affect the ability of the device to measure CFM flow rates of air through the blower-motor. If there is a question on the function

Maintaining 3M GVP Powered Air Purifying Respirators**Published Date: 06/10/2009****Effective Date: 06/10/2009**

of any flow check device, it should be checked against two other flow check devices and discarded if it does not provide near-identical readings.

The flow check device must be discarded if it is visibly damaged or broken.

3.6 Breathing Tube Inspection

- The breathing tube must be visually inspected for any signs of damage, cracks, cuts, holes, or missing parts.
- Any damaged breathing tube must be discarded.

3.7 New Nickel Metal Hydride (NiMH) Battery Properties and Conditioning

NOTES: *The initial battery conditioning is to be performed by the Hanford Fire Department.*

- ❖ BP-15 battery packs stored at room temperature lose approximately 2% of their charge per day after charging.
- ❖ A new battery must be fully charged and discharged (by running for seven to eight hours) three times to reach maximum efficiency. This activity must be logged along with the battery unique identification number on the Quarterly/Initial PAPR Battery Charging and Inspection Log (Attachment 3).

- Charge the BP-15 battery pack only with the BC-210 smart battery charger.
- To maximize battery life, these guidelines should be followed:
 - 3M BP-15 battery packs may be charged any time during the discharge cycle. Battery memory (also known as voltage depression) is not a significant factor in PAPR applications.
 - 3M BP-15 battery packs may remain connected to the BC-210 charger for an extended period of time. The BC-210 charger will “trickle charge” the BP-15 battery to overcome normal charge loss. This is the recommended storage method for maximum battery performance.
 - Do not allow water to enter the battery housing as this will damage the battery assembly.
 - Always charge the BP-15 battery pack at a temperature between 50°F (10°C) and 90°F (32°C). Beyond this range, the battery may not accept a full charge.
 - Infrequently used batteries, such as those placed in short-term storage that are not left on a charger to trickle charge, should be conditioned according to section 3.1 and then fully charged prior to use.
- The 3M BP-15 Battery Pack has a red indicator light, located on the top of the battery by the switch. This light provides status of the battery charge when the battery switch is turned on.
- After fully charging the battery and connecting it to the blower, the indicator light should be off.

Maintaining 3M GVP Powered Air Purifying Respirators**Published Date: 06/10/2009****Effective Date: 06/10/2009**

- The red light on the battery indicates that the battery has reached a point where the battery must be recharged. The battery has a low-voltage detection circuit that will engage shortly after the red light comes on. When it engages, the battery will shut down and the blower will stop running. Therefore, when the red light comes on, immediately leave the area and recharge the battery.

NOTE: *If the battery has been run down enough to engage the low voltage detection circuit, the red light on the battery will no longer function until the battery has been recharged.*

- Operational time of the battery will be reduced as the operating temperature goes down.
- Batteries shall not be off of the charger for greater than 72 hours prior to assembly and issuance of a PAPR unit. This activity must be logged along with the battery unique identification number on the Daily PAPR Battery Charging Log (Attachment 2).
- PAPR units shall not be assembled and stored for greater than 72 hours.
- Insert the charging lead into the charging socket on the top of the BP-15 battery. The LED indicator on the adapter module (on the right) shows the status of the charging process (Table 2).

Table 2. Charger Status/Adaptor Module Indicators

Power Base Status	LED Status
Power ON	Momentary (single) flash green.
Standby; Waiting to charge.	Steady yellow.
Rapid charging.	Rapid flashing green.
Top-off charging.	Slow flashing green.
Charge complete; Ready mode.	Steady green.
Battery fault.	Steady red.*
* If a charger indicates a battery fault error, unplug and wait five minutes before plugging the charger into another battery or the same battery.	

3.8 Quarterly Nickel Metal Hydride Battery Capacity Verification

NOTE: *The quarterly battery capacity verification is to be performed by the Hanford Fire Department.*

- Acquire a completely charged battery.
- Attach battery to blower with a P-100 cartridge and run for six hours.
- Conduct flow test to verify 6 CFM for hoods or 4 CFM for facepieces.
- Discard battery if flow is less than 6 CFM/4 CFM, respectively.

Maintaining 3M GVP Powered Air Purifying Respirators**Published Date: 06/10/2009****Effective Date: 06/10/2009**

- Document Pass / Fail on the Quarterly/Initial PAPR Battery Charging Log (Attachment 3).
- Allow the batteries to run one additional hour for all assembled PAPR units that pass the flow verification test.
- Apply a sticker to the battery with an expiration date 90 calendar days from the date of inspection.
- All batteries passing the flow test will be returned to charging station.

3.9 Pre-assembly and Quarterly Blower-Motor Inspection (GVP-100)

NOTE: *The quarterly battery capacity verification is to be performed by the Hanford Fire Department.*

The blower-motor must be checked for the following for both the quarterly and pre-assembly process:

- Remove inlet and outlet motor/blower plugs (GVP-115) – do not discard plugs; they should be re-inserted when the blower is not assembled.
- Visually inspect the case for signs of damage to filter threads, filter seating area, and for damage to any visible internal wiring.
- Verify that electrical terminal is not loose on blower motor.
 - If loose, remove from service and generate a *CH-PRC Respiratory Problem or Complaint Form* (A-6001-893).
- Verify that the filter gasket and breather tube inlet gasket are present and in good condition.
 - Replace gaskets as necessary.
- Verify the function of the blower-motor by attaching a battery and turning it on.
- Verify the minimum flow of 6 CFM for hoods or 4 CFM for facepiece, with a P-100 cartridge installed on the blower using the 3M flow check device and adapter (GVP-113 and L-181).
- If the blower-motor does not pass the flow test, recheck once with a different battery.
- Discard the blower-motor if it fails this inspection.

If conducting a quarterly inspection and the blower assembly passes:

- Record results on the Quarterly PAPR Blower Inspection Log (Attachment 1).
- Apply a sticker to the blower-motor with an expiration date 90 calendar days from the date of the inspection.

Maintaining 3M GVP Powered Air Purifying Respirators**Published Date: 06/10/2009****Effective Date: 06/10/2009****3.10 Pre Assembly Nickel Metal Hydride (NiMH) Battery (BP-15) Inspection**

The battery must be checked for the following:

- Any signs of damage to the exterior of the battery.
- Verify that the battery is fully charged by referring to the LED status on the charger or the Daily PAPR Battery Charging Log (Attachment 2).

NOTE: *Battery must be charged within 72 hours before use.*

- Verify the battery will produce adequate flow as measured in Section 3.7.
- Repeat charging and test again using a different blower-motor, if the first charge results do not pass the step above.
 - Repeat no more than once.
 - Document this on the *CH-PRC Respiratory Problem or Complaint Form (A-6001-893)*.
- Mark the battery as “out of service” and discard the battery in accordance with waste management guidelines if it fails this inspection.
- Record charging times on the Daily PAPR Battery Charging Log (Attachment 2).

3.11 Belt Inspection

NOTE: *3M does not permit cutting the GVP PAPR belt to a smaller size.*

- The belt and buckle should be visually inspected for any signs of damage.
- Any damaged or cut belts or buckles must be discarded.

3.12 Long-Term Storage and Disposition of Equipment

Equipment that is not used or batteries that have not been charged for more than 90 days shall be run through Sections 3.3 to 3.11 before being returned to use. If units may not be used in the near future, they shall be kept in clean, temperature-controlled storage areas and identified as temporarily out of service. If units are no longer needed, the equipment should be transferred to convenience storage. Equipment in convenience storage will be reviewed periodically to determine if it should be re-distributed, disposed of, or managed as surplus property.

Long-term storage or removal of PAPRs from inventory must be recorded on the appropriate attachments.

4.0 FORMS

Quarterly PAPR Blower Inspection Log (Attachment 1)

Daily PAPR Battery Charging Log (Attachment 2)

Quarterly / Initial PAPR Battery charging and Inspection Log (Attachment 3)

CH-PRC Respiratory Problem or Complaint Form (A-6001-893)

Maintaining 3M GVP Powered Air Purifying Respirators**Published Date: 06/10/2009****Effective Date: 06/10/2009****5.0 RECORD IDENTIFICATION**

All records are generated, processed, and maintained in accordance with PRC-PRO-IRM-10588, *Records Management Processes*. OCRWM records are also managed in accordance with PRC-PRO-QA-19579, *OCRWM Records Management*.

Records Capture Table

Name of Record	Submittal Responsibility	Retention Responsibility	OCRWM Retention Schedule (If OCRWM Related)
Quarterly PAPR Blower Inspection Log	Hanford Fire Department	Respiratory Protection Program Administrator (RPPA)	N/A
Daily PAPR Battery Charging Log	Issuer	Supervisor	N/A
Quarterly / Initial PAPR Battery Charging and Inspection Log	Hanford Fire Department	Supervisor	N/A
Respiratory Problem or Complaint Form	Issuer, User, or Hanford Fire Department	RPPA	N/A

6.0 SOURCES**6.1 Requirements**

PRC-RD-SH-36716, *Respiratory Protection Program Requirements*
PRC-PRO-SH-120, *Respiratory Protection Program*

6.2 References

3M GVP Series Belt-Mounted Powered Air-Purifying Respirator Assembly
(see CHPRC website for current version)
3M Smart Battery Charger BC-210 and Battery Pack BP-15 User instructions
(see CHPRC website for current version)

PRC-PRO-IRM-10588, *Records Management Processes*
PRC-PRO-QA-19579, *OCRWM Records Management*

Maintaining 3M GVP Powered Air Purifying Respirators

Published Date: 06/10/2009

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Attachment 1

Quarterly PAPR Blower Inspection Log

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Effective Date: 06/10/2009

Pass (P) / Fail (F)
* Including Damage

